Small Business Innovation Research/Small Business Tech Transfer

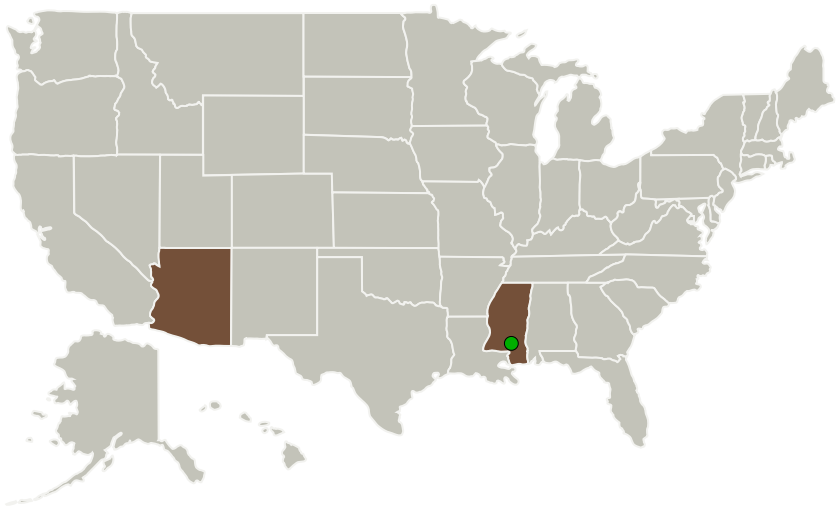
Helium Recovery System Based on High-Performance Proton Exchange Membranes, Phase I

Completed Technology Project (2015 - 2015)

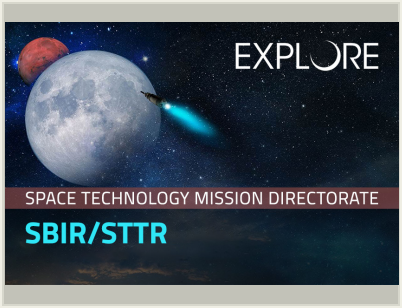
Project Introduction

This SBIR project aims to develop a helium recovery system based on high-performance proton exchange membranes (PEM). The PEM will be fabricated based on Amsen's existing technology. Membrane electrode assemblies (MEA) will be fabricated using the high-performance PEM. The processing and interfacial microstructure of the MEA will be optimized to minimize electrode overpotentials. Based on the optimized MEA, breadboard cells of the helium recovery system will be built and tested with pre-mixed helium/hydrogen mixtures in laboratory environment or relevant environment. Performance of the new helium recovery system will be contrasted with a baseline system based on the commercial Nafion membranes. The technology readiness level (TRL) by the end of Phase I is expected to be 4-5.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Amsen Technologies, LLC	Lead Organization	Industry	Tucson, Arizona
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi



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Primary U.S. Work Locations	
Arizona	Mississippi

Project Transitions

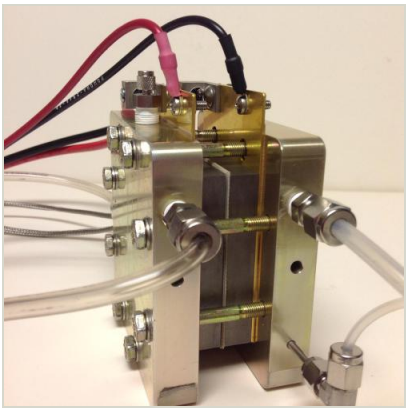
June 2015: Project Start

December 2015: Closed out

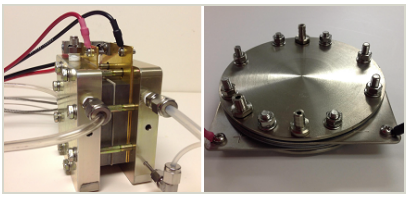
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139040)*

Images



Briefing Chart
Helium Recovery System Based on High-Performance Proton Exchange Membranes Briefing Chart *(https://techport.nasa.gov/image/126421)*



Final Summary Chart Image
Helium Recovery System Based on High-Performance Proton Exchange Membranes, Phase I Project Image *(https://techport.nasa.gov/image/135194)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Amsen Technologies, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

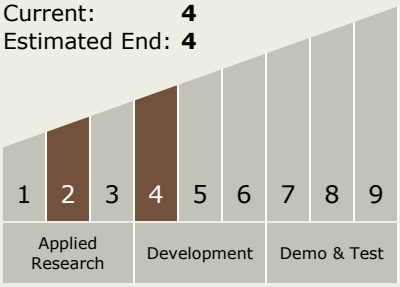
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Hongxing Hu

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Completed Technology Project (2015 - 2015)

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.3 Assembly, Integration and Launch
    - TX13.3.3 Launch, Recovery and Reutilization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System